

Application No. 09/991,653
Response filed January 29, 2004
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REMARKS/ARGUMENTS

Reconsideration and allowance of the present application based on the following remarks are respectfully requested.

Withdrawal of the final rejection and favorable reconsideration and allowance of the present application based on the following remarks are respectfully requested.

A clean copy of the pending claims 1-35 is attached hereto for the convenience of the Examiner.

At the outset, Applicants respectfully submit that the finality of the current Office Action was premature because it does not appear to have taken into consideration the amendments to the claims which were entered upon filing the present Request for Continued Examination.

Specifically, in response to the Final Rejection dated March 23, 2003, Applicants timely filed an amendment on June 17, 2003. The Amendment was not entered, as per the Advisory Action dated July 10, 2003. Accordingly, on July 16, 2003, Applicants timely filed a Request for Continued Examination (RCE), which requested (at box 1.a.i.) that the amendments under 37 CFR 1.116, filed June 17, 2003, be considered and any unentered amendments entered into the application. This does not appear to have been done.

First, the Detailed Action does not refer to this application as an RCE but merely states at paragraph 3, that "[t]his is a Continuation of applicant's earlier Application No. 09/991,653." However, the very next sentence states that "[a]ll claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office Action if they had been entered in the earlier application." This sentence is believed not to be applicable in the context of this RCE application. At a minimum, the current Office Action fails to address any of the claim amendments presented in the Amendment of June 17, 2003 or, explain why the rejection under Section 102(e) based on Putzig *et al*, '714 remains viable.

Accordingly, it is submitted that the finality of the current Office Action should be withdrawn. It is further submitted that the present application is in condition for allowance and, accordingly, favorable reconsideration is requested.

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The previously presented amendments, clearly distinguished the claimed invention over the prior art to Putzig *et al* '714, at least for the reason that claim 1 recites the presence of the optional base (see, e.g., claim 2 for the presence of base); and requires that when the base is present it is one of the specifically named classes (inorganic bases, quaternary ammonium compounds) or compounds (mono- or di- ethanolamine); such definition specifically does not include tertiary amines. It is noted that claims 2-4, 16 and 33-35, are all directed to the embodiment wherein the optional base is used in the reaction product.

In contrast, as described at column 3, lines 52-63, the titanium-containing catalyst composition of Putzig *et al* '714, is limited to tertiary amines as the amine component. There is no disclosure of a reaction product wherein an inorganic base or quaternary ammonium compound or monoethanolamine or diethanolamine is reacted with an orthoester or condensed orthoester of Ti, Zr or Al, an alcohol containing at least two hydroxyl groups and an organophosphorus compound containing at least one P-OH group.

Therefore, the exclusion of Putzig's essential tertiary amines from the scope of the pending claims eliminates the relevancy, if any, of Putzig *et al*, as anticipatory of the pending subject matter, since according to this reference only reaction products which include a base which is a tertiary amine compound are disclosed.

Therefore, regardless of whether the disclosure of Putzig at column 5, lines 50-58, supports the conclusion that the disclosed reaction product includes polyhydric alcohol, e.g., ethylene glycol, (as a solvent), the presently pending claims, which do not include the reaction product of a tertiary amine (base compound), are not anticipated by the disclosure of Putzig *et al* '714.

It is submitted, therefore, that the pending claims are not anticipated by Putzig *et al*, '714, and, therefore, the rejection of claims 1-35 under 35 U.S.C. 102(e) should be withdrawn.

Claims 18 and 20 are directed to the embodiment wherein the co-catalyst includes a germanium compound or a tin compound. Since only antimony and cobalt compounds are disclosed in Putzig *et al* '719 as cocatalyst, the subject matters of claims 18 and 20 are not anticipated by Putzig for this additional reason.

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Claims 3, 4 and 17 are directed to the embodiment wherein the reaction product includes a 2-hydroxy carboxylic acid. This subject matter is not anticipated by Putzig, *et al* '714, for this additional reason.

At least pending claims 12, 13 and 14 recite particular organophosphorus compounds which are not disclosed by Putzig, *et al*, '714, therefore, these claims are not anticipated by the reference.

Accordingly, each of claims 3, 4, 12, 13, 14, 17, 18 and 20 are believed to be in condition for allowance, independently of the allowability and allowance of claim 1.

For all of the above reasons, reconsideration and withdrawal of the rejection of claims 1-35 as anticipated by Putzig, *et al*, U.S. 6,055,714, is respectfully requested.

Again, since the current Office Action does not address these issues it is believed that the finality of the Office Action was premature. Furthermore, it is believed that the pending claims are allowable over the prior art. However, if for any reason, the claims are not found to be allowable (and issues which cannot be resolved by telephone remain present), a new (and, if new issues are raised, non-final) action should issue.

Applicants have not received a copy of the Form PTO-1449, filed by Applicants on December 30, 2002, initialed by the Examiner. Applicants respectfully request that the reference be considered and made of record in the subject application by return of the initialed and dated copy of the PTO Form 1449.


Therefore, all objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

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Should any issues remain unresolved, the Examiner is encouraged to contact the undersigned attorney for Applicants at the telephone number indicated below in order to expeditiously resolve any remaining issues.

Respectfully submitted,

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Date: January 29, 2004
Attachment: Appendix of Pending Claims

30430240v1

5. (Previously presented) A catalyst composition according to claim 1, wherein the orthoester has the formula $M(OR)_4$ and/or $Al(OR)_3$ wherein M is titanium and/or zirconium and R is an alkyl group containing from 1 to 6 carbon atoms.

6. (Previously presented) A catalyst composition according to claim 1, wherein the condensed orthoester has a structure which can be represented by the formula, $R^1O[M(OR^1)_2O]R_n$ where M is titanium and/or zirconium, R^1 is an alkyl group containing 1 to 6 carbon atoms and n is less than 20.

7. (Previously presented) A catalyst composition according to claim 1, wherein the alcohol containing at least two hydroxyl groups is 1,2-ethanediol, 1,2-propanediol, 1,3-propanediol, 1,4-butanediol, 2-methyl-2,4-pentanediol, diethylene glycol, polyethylene glycol, glycerol, trimethylolpropane, pentaerythritol or 1,6 cyclohexane dimethanol.

8. (Previously presented) A catalyst composition according to claim 1, wherein the organometallic compound is prepared by reacting a dihydric alcohol with an orthoester or condensed orthoester in a ratio of from 1 to 32 moles of dihydric alcohol to each mole of titanium, zirconium or aluminum.

9. (Previously presented) A catalyst composition according to claim 1, wherein the organophosphorus compound is a phosphate, a pyrophosphate, a phosphonate, a phosphinate, a phosphite or a salt of a phosphate or phosphonate or a phosphorous derivative of a hydroxy acid.

10. (Previously presented) A catalyst composition according to claim 9, wherein the organophosphorous compound is a substituted or unsubstituted alkyl phosphate, a substituted or unsubstituted aryl phosphate, a salt of an alkyl or aryl phosphonate, a phosphate of an alkylaryl glycol ether or an alkyl glycol ether, or a product obtainable by reaction of phosphorus pentoxide with a polyhydric alcohol.

11. (Previously presented) A catalyst composition according to claim 10, wherein the organophosphorus compound is an alkyl phosphate in which the organic group contains up to 20 carbon atoms.

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12. (Previously presented) A catalyst composition according to claim 10, wherein the organophosphorus compound is a phosphate of an alkylaryl glycol ether or an alkyl glycol ether having a carbon chain length up to 18 carbon atoms.

13. (Previously presented) A catalyst composition according to claim 10, wherein the organophosphorus compound is a reaction product of phosphorus pentoxide and a polyhydric alcohol in which the molar ratio of polyhydric alcohol to P is up to 50:1.

14. (Previously presented) A catalyst composition according to claim 9, wherein the organophosphorus compound is a phosphorous derivative of a hydroxy acid.

15. (Previously presented) A catalyst composition according to claim 1, wherein the organophosphorus compound is present in the organometallic compound in an amount in the range 0.1 to 4.0 mole of phosphorus to 1 mole of titanium, zirconium or aluminum.

16. (Previously presented) A catalyst composition according to claim 1, wherein a said base is present in the organometallic compound in an amount in the range 0.01 to 4.0 mole of base to 1 mole of titanium, zirconium or aluminum.

17. (Previously presented) A catalyst composition according to claim 3, wherein the 2-hydroxy acid is present in the organometallic compound in an amount in the range 0.1 to 4 mole acid to 1 mole of titanium, zirconium or aluminum.

18. (Previously presented) A catalyst composition according to claim 1, wherein the compound of germanium is present and is germanium dioxide or a salt of germanium.

19. (Previously presented) A catalyst composition according to claim 1, wherein the compound of antimony is present and is antimony trioxide or a salt of antimony.

20. (Previously presented) A catalyst composition according to claim 1, wherein the compound of tin is present and is a tin salt, a dialkyl tin oxide, a dialkyl tin dialkanoate or an alkylstannoic acid.

21. (Previously presented) A catalyst composition according to claim 1, wherein the molar ratio of the organometallic compound to the compound of germanium, antimony or tin is in the range 9:1 to 1:9 calculated as moles of Ti, Zr or Al to moles of Ge, Sb or Sn.

22. (Previously presented) A process for the preparation of an ester comprising carrying out an esterification reaction in the presence of a catalyst comprising the catalyst according to claim 1.

23. (Previously presented) A process according to claim 22, wherein the esterification reaction comprises reaction of an alcohol with stearic acid, isostearic acid, capric acid, caproic acid, palmitic acid, oleic acid, palmitoleic acid, triacontanoic acid, benzoic acid, methyl benzoic acid, salicylic acid, a rosin acid, abietic acid, phthalic acid, isophthalic acid, terephthalic acid, sebacic acid, adipic acid, azelaic acid, succinic acid, fumaric acid, maleic acid, naphthalene dicarboxylic acid, pamoic acid, trimellitic acid, citric acid, trimesic acid or pyromellitic acid.

24. (Previously presented) A process according to claim 22, wherein the esterification reaction comprises a reaction of an alcohol with an anhydride of a dicarboxylic acid or a tricarboxylic acid.

25. (Previously presented) A process according to claim 22, wherein the esterification reaction comprises reaction of a methyl ester, an ethyl ester or a propyl ester of acrylic acid or methacrylic acid with an alcohol.

26. (Previously presented) A process according to claim 22, wherein the esterification reaction comprises reaction of two esters to produce two different esters by exchange of alkoxy groups.

27. (Previously presented) A process according to claim 22, wherein the esterification reaction comprises a polyesterification comprising the reaction of terephthalic acid, dimethyl terephthalate, dimethyl naphthalenate or naphthalene dicarboxylic acid with 1,2-ethanediol, 1,4-butanediol, 1,3-propanediol, 1,6 cyclohexane dimethanol, trimethylolpropane or pentaerythritol.

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28. (Previously presented) A process according to claim 22, wherein the catalyst is present in an amount in the range 10 to 1200 parts per million calculated as parts by weight of total metal (Ti, Zr or Al plus Ge, Sb or Sn) with respect to weight of product ester.

29. (Previously presented) A process according to claim 22 or 27, wherein the esterification reaction is a polyesterification and the catalyst is present in an amount in the range 5 to 550 parts per million calculated as parts by weight total metal (Ti, Zr or Al plus Ge, Sb or Sn) with respect to weight of product polyester.

30. (Previously presented) A process according to claim 22, wherein the total amount of titanium, zirconium or aluminum present is in the range 5 to 500 parts per million calculated as parts by weight of Ti, Zr or Al with respect to weight of product ester and the total amount of germanium, antimony or tin present is in the range 5 to 700 ppm calculated as Ge, Sb or Sn with respect to product ester.

31. (Previously presented) A process according to claim 22, wherein the total amount of titanium, zirconium or aluminum present is in the range 3 to 250 parts per million calculated as parts by weight of Ti, Zr or Al with respect to weight of product polyester and the total amount of germanium, antimony or tin present is in the range 3 to 300 ppm calculated as Ge, Sb or Sn with respect to product polyester.

32. (Original) A polyester comprising the residues of a reaction between a polybasic acid or ester thereof with a polyhydric alcohol and further containing residues of a catalyst system comprising:

- (a) the reaction product of an orthoester or condensed orthoester of at least one metal selected from titanium, zirconium or aluminium, an alcohol containing at least two hydroxyl groups and an organophosphorus compound containing at least one P-OH group, and
- (b) at least one compound of germanium, antimony or tin.

33. (Previously presented) The catalyst composition of claim 1 wherein said reaction product is obtained by mixing the orthoester or condensed orthoester and a dihydric alcohol; and, subsequently, adding a said base, followed by addition of the organophosphorus compound.

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34. (Previously presented) The catalyst composition of claim 3 wherein said reaction product is obtained by adding said 2-hydroxy carboxylic acid to said orthoester or condensed orthoester before said organophosphorus compound is added.

35. (Previously presented) The catalyst composition of claim 3 wherein at least a portion of said 2-hydroxy carboxylic acid is neutralized with at least a part of said base and the resulting salt is added to the other components of the reaction mixture.

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Date: March 24, 2004 Must Be Sent By: asap
To: Examiner Samuel Acquah Fax No: (703) 872-9306
Company: GAU 1711, USPTO Phone No:
Confirm: Confirmed By:
From: Richard A. Steinberg Phone No: (703) 905-2039
User No: 15011 C/M No: 083255-0284080
Comments:

PLEASE EXPEDITE – COPY OF PRIOR FILING

RE: U.S. Serial No. 09/991,653 to Lindall et al.

Dear Examiner Acquah:

Pursuant to our telephone conference, attached please find a copy of the Response filed January 29, 2004 with a copy of the date-stamped receipt.

Please do not hesitate to contact our office should you have any questions.

Best regards,

Richard A. Steinberg

Confidentiality Note

The documents accompanying this facsimile transmission may contain confidential information which is legally privileged. The information is intended only for the use of the individual or entity named above. If you are not the intended recipient, or the person responsible for delivering it to the intended recipient, you are hereby notified that any disclosure, copying, distribution or use of any of the information contained in this transmission is strictly PROHIBITED. If you have received this transmission in error, please immediately notify us by telephone and mail the original transmission to us. Thank you.

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Application Serial No. 09/991,653	Atty. Paul L. Sharer/RAS/kmh
First Inventor: Charles M. Lindall	Date: January 29, 2004
Title: ESTERIFICATION CATALYSTS	Attorney Docket No. 083255-0284080

ENCLOSED:

- ☒ Response to Final Rejection
- ☒ Non-Fee Response Transmittal

\$ Total Fee Charged to Deposit Account

CURRENT DUE DATE:



IN THE UNITED STATES PATENT & TRADEMARK OFFICE

Application Number : 09/991,653 Confirmation No. 7583
 Applicant : Charles M. Lindall et al.
 Filed : November 26, 2001
 Tech Cntr/AU : 1711
 Examiner : Samuel A. Acquah
 Entitled : Esterification Catalysts
 Attorney Reference : 083255-0284080
 Customer Number : 00909

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Commissioner for Patents

P.O. Box 1450

Alexandria, Virginia 22313-1450

AMENDMENT/RESPONSE TRANSMITTAL

Transmitted herewith is an amendment/response for this application.

EXTENSION OF TIME

No extension of time under 37 C.F.R. 1.136 is believed necessary.

CLAIM FEES

The claim fees have been calculated as follows:

	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NO. PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE	ADDITIONAL FEE
Total	35	—	35	= 0 x \$ 18.00	= \$ 0.00
Independent	3	—	3	= 0 x \$ 84.00	= \$ 0.00
FIRST PRESENTATION OF MULTIPLE DEP. CLAIM+ \$ 280.00					= \$ 0.00
TOTAL ADDITIONAL CLAIM FEE DUE					\$ 0.00

FEE PAYMENT

Authorization is hereby made to charge any deficiencies in the fees, or credit any overpayments, to Deposit Account No. 03-3975.

Date: January 29, 2004

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 McLean, VA 22102
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RICHARD A. STEINBERG
 Registration No. 26,588

Customer No. 00909

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MAR 24 2004

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

Application Number : 09/991,653 Confirmation No. 7583
Applicant : Charles M. Lindall et al.
Filed : November 26, 2001
Tech Cntr/AU : 1711
Examiner : Samuel A. Acquah
Entitled : Esterification Catalysts

Attorney Reference : 083255-0284080
Customer Number : 00909

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Commissioner for Patents

P.O. Box 1450

Alexandria, Virginia 22313-1450

RESPONSE TO FINAL REJECTION

Sir:

In response to the Office Action mailed October 29, 2004 for the above-identified application, amendments and/or remarks submitted herewith include:

- Remarks and arguments.

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REMARKS/ARGUMENTS

Reconsideration and allowance of the present application based on the following remarks are respectfully requested.

Withdrawal of the final rejection and favorable reconsideration and allowance of the present application based on the following remarks are respectfully requested.

A clean copy of the pending claims 1-35 is attached hereto for the convenience of the Examiner.

At the outset, Applicants respectfully submit that the finality of the current Office Action was premature because it does not appear to have taken into consideration the amendments to the claims which were entered upon filing the present Request for Continued Examination.

Specifically, in response to the Final Rejection dated March 23, 2003, Applicants timely filed an amendment on June 17, 2003. The Amendment was not entered, as per the Advisory Action dated July 10, 2003. Accordingly, on July 16, 2003, Applicants timely filed a Request for Continued Examination (RCE), which requested (at box 1.a.i.) that the amendments under 37 CFR 1.116, filed June 17, 2003, be considered and any unentered amendments entered into the application. This does not appear to have been done.

First, the Detailed Action does not refer to this application as an RCE but merely states at paragraph 3, that "[t]his is a Continuation of applicant's earlier Application No. 09/991,653." However, the very next sentence states that "[a]ll claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office Action if they had been entered in the earlier application." This sentence is believed not to be applicable in the context of this RCE application. At a minimum, the current Office Action fails to address any of the claim amendments presented in the Amendment of June 17, 2003 or, explain why the rejection under Section 102(e) based on Putzig *et al.*, '714 remains viable.

Accordingly, it is submitted that the finality of the current Office Action should be withdrawn. It is further submitted that the present application is in condition for allowance and, accordingly, favorable reconsideration is requested.

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The previously presented amendments, clearly distinguished the claimed invention over the prior art to Putzig *et al* '714, at least for the reason that claim 1 recites the presence of the optional base (see, e.g., claim 2 for the presence of base); and requires that when the base is present it is one of the specifically named classes (inorganic bases, quaternary ammonium compounds) or compounds (mono- or di- ethanolamine); such definition specifically does not include tertiary amines. It is noted that claims 2-4, 16 and 33-35, are all directed to the embodiment wherein the optional base is used in the reaction product.

In contrast, as described at column 3, lines 52-63, the titanium-containing catalyst composition of Putzig *et al* '714, is limited to tertiary amines as the amine component. There is no disclosure of a reaction product wherein an inorganic base or quaternary ammonium compound or monoethanolamine or diethanolamine is reacted with an orthoester or condensed orthoester of Ti, Zr or Al, an alcohol containing at least two hydroxyl groups and an organophosphorus compound containing at least one P-OH group.

Therefore, the exclusion of Putzig's essential tertiary amines from the scope of the pending claims eliminates the relevancy, if any, of Putzig *et al*, as anticipatory of the pending subject matter, since according to this reference only reaction products which include a base which is a tertiary amine compound are disclosed.

Therefore, regardless of whether the disclosure of Putzig at column 5, lines 50-58, supports the conclusion that the disclosed reaction product includes polyhydric alcohol, e.g., ethylene glycol, (as a solvent), the presently pending claims, which do not include the reaction product of a tertiary amine (base compound), are not anticipated by the disclosure of Putzig *et al* '714.

It is submitted, therefore, that the pending claims are not anticipated by Putzig *et al*, '714, and, therefore, the rejection of claims 1-35 under 35 U.S.C. 102(e) should be withdrawn.

Claims 18 and 20 are directed to the embodiment wherein the co-catalyst includes a germanium compound or a tin compound. Since only antimony and cobalt compounds are disclosed in Putzig *et al* '719 as cocatalyst, the subject matters of claims 18 and 20 are not anticipated by Putzig for this additional reason.

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Claims 3, 4 and 17 are directed to the embodiment wherein the reaction product includes a 2-hydroxy carboxylic acid. This subject matter is not anticipated by Putzig, *et al* '714, for this additional reason.

At least pending claims 12, 13 and 14 recite particular organophosphorus compounds which are not disclosed by Putzig, *et al*, '714, therefore, these claims are not anticipated by the reference.

Accordingly, each of claims 3, 4, 12, 13, 14, 17, 18 and 20 are believed to be in condition for allowance, independently of the allowability and allowance of claim 1.

For all of the above reasons, reconsideration and withdrawal of the rejection of claims 1-35 as anticipated by Putzig, *et al*, U.S. 6,055,714, is respectfully requested.

Again, since the current Office Action does not address these issues it is believed that the finality of the Office Action was premature. Furthermore, it is believed that the pending claims are allowable over the prior art. However, if for any reason, the claims are not found to be allowable (and issues which cannot be resolved by telephone remain present), a new (and, if new issues are raised, non-final) action should issue.

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Therefore, all objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

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Respectfully submitted,

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Date: January 29, 2004
Attachment: Appendix of Pending Claims

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Application No. 09/991,653
Appendix of Pending Claims

Pending Claims:

These claims were previously submitted by Amendment on June 17, 2003.

1. (Previously presented) A catalyst composition suitable for use as a catalyst for the preparation of an ester comprising

- (a) an organometallic compound which is the reaction product of
 - (i) an orthoester or condensed orthoester of at least one metal selected from the group consisting of titanium, zirconium and aluminum,
 - (ii) an alcohol containing at least two hydroxyl groups,
 - (iii) an organophosphorus compound containing at least one P-OH group, and
 - (iv) optionally, a base, wherein, when said base is used, it is selected from the group consisting of inorganic bases, quaternary ammonium compounds, monoethanolamine and diethanolamine; and
- (b) at least one compound of germanium, antimony or tin.

2. (Previously presented) A catalyst composition according to claim 1, wherein the organometallic compound comprises the reaction product of an orthoester or condensed orthoester of at least one metal selected from the group consisting of titanium, zirconium and aluminum, an alcohol containing at least two hydroxyl groups, and an organophosphorus compound containing at least one P-OH group, and said base.

3. (Previously presented) A catalyst composition according to claim 1, wherein the organometallic compound comprises the reaction product of an orthoester or condensed orthoester of at least one metal selected from the group consisting of titanium, zirconium and aluminum, an alcohol containing at least two hydroxyl groups, an organophosphorus compound containing at least one P-OH group, a said base and (v) a 2-hydroxy carboxylic acid.

4. (Previously presented) A catalyst composition according to claim 3, wherein the 2-hydroxy acid is lactic acid, citric acid, malic acid or tartaric acid or a phosphorus derivative of at least one of said acids.

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5. (Previously presented) A catalyst composition according to claim 1, wherein the orthoester has the formula $M(OR)_4$ and/or $Al(OR)_3$ wherein M is titanium and/or zirconium and R is an alkyl group containing from 1 to 6 carbon atoms.

6. (Previously presented) A catalyst composition according to claim 1, wherein the condensed orthoester has a structure which can be represented by the formula, $R^1O[M(OR^1)_2O]_nR^1$ where M is titanium and/or zirconium, R^1 is an alkyl group containing 1 to 6 carbon atoms and n is less than 20.

7. (Previously presented) A catalyst composition according to claim 1, wherein the alcohol containing at least two hydroxyl groups is 1,2-ethanediol, 1,2-propanediol, 1,3-propanediol, 1,4-butanediol, 2-methyl-2,4-pentanediol, diethylene glycol, polyethylene glycol, glycerol, trimethylolpropane, pentaerythritol or 1,6 cyclohexane dimethanol.

8. (Previously presented) A catalyst composition according to claim 1, wherein the organometallic compound is prepared by reacting a dihydric alcohol with an orthoester or condensed orthoester in a ratio of from 1 to 32 moles of dihydric alcohol to each mole of titanium, zirconium or aluminum.

9. (Previously presented) A catalyst composition according to claim 1, wherein the organophosphorus compound is a phosphate, a pyrophosphate, a phosphonate, a phosphinate, a phosphite or a salt of a phosphate or phosphonate or a phosphorous derivative of a hydroxy acid.

10. (Previously presented) A catalyst composition according to claim 9, wherein the organophosphorous compound is a substituted or unsubstituted alkyl phosphate, a substituted or unsubstituted aryl phosphate, a salt of an alkyl or aryl phosphonate, a phosphate of an alkylaryl glycol ether or an alkyl glycol ether, or a product obtainable by reaction of phosphorus pentoxide with a polyhydric alcohol.

11. (Previously presented) A catalyst composition according to claim 10, wherein the organophosphorus compound is an alkyl phosphate in which the organic group contains up to 20 carbon atoms.

30430246v1

12. (Previously presented) A catalyst composition according to claim 10, wherein the organophosphorus compound is a phosphate of an alkylaryl glycol ether or an alkyl glycol ether having a carbon chain length up to 18 carbon atoms.

13. (Previously presented) A catalyst composition according to claim 10, wherein the organophosphorus compound is a reaction product of phosphorus pentoxide and a polyhydric alcohol in which the molar ratio of polyhydric alcohol to P is up to 50:1.

14. (Previously presented) A catalyst composition according to claim 9, wherein the organophosphorus compound is a phosphorous derivative of a hydroxy acid.

15. (Previously presented) A catalyst composition according to claim 1, wherein the organophosphorus compound is present in the organometallic compound in an amount in the range 0.1 to 4.0 mole of phosphorus to 1 mole of titanium, zirconium or aluminum.

16. (Previously presented) A catalyst composition according to claim 1, wherein a said base is present in the organometallic compound in an amount in the range 0.01 to 4.0 mole of base to 1 mole of titanium, zirconium or aluminum.

17. (Previously presented) A catalyst composition according to claim 3, wherein the 2-hydroxy acid is present in the organometallic compound in an amount in the range 0.1 to 4 mole acid to 1 mole of titanium, zirconium or aluminum.

18. (Previously presented) A catalyst composition according to claim 1, wherein the compound of germanium is present and is germanium dioxide or a salt of germanium.

19. (Previously presented) A catalyst composition according to claim 1, wherein the compound of antimony is present and is antimony trioxide or a salt of antimony.

20. (Previously presented) A catalyst composition according to claim 1, wherein the compound of tin is present and is a tin salt, a dialkyl tin oxide, a dialkyl tin dialkanoate or an alkylstannoic acid.

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21. (Previously presented) A catalyst composition according to claim 1, wherein the molar ratio of the organometallic compound to the compound of germanium, antimony or tin is in the range 9:1 to 1:9 calculated as moles of Ti, Zr or Al to moles of Ge, Sb or Sn.

22. (Previously presented) A process for the preparation of an ester comprising carrying out an esterification reaction in the presence of a catalyst comprising the catalyst according to claim 1.

23. (Previously presented) A process according to claim 22, wherein the esterification reaction comprises reaction of an alcohol with stearic acid, isostearic acid, capric acid, caproic acid, palmitic acid, oleic acid, palmitoleic acid, triacontanoic acid, benzoic acid, methyl benzoic acid, salicylic acid, a rosin acid, abietic acid, phthalic acid, isophthalic acid, terephthalic acid, sebacic acid, adipic acid, azelaic acid, succinic acid, fumaric acid, maleic acid, naphthalene dicarboxylic acid, pamoic acid, trimellitic acid, citric acid, trimesic acid or pyromellitic acid.

24. (Previously presented) A process according to claim 22, wherein the esterification reaction comprises a reaction of an alcohol with an anhydride of a dicarboxylic acid or a tricarboxylic acid.

25. (Previously presented) A process according to claim 22, wherein the esterification reaction comprises reaction of a methyl ester, an ethyl ester or a propyl ester of acrylic acid or methacrylic acid with an alcohol.

26. (Previously presented) A process according to claim 22, wherein the esterification reaction comprises reaction of two esters to produce two different esters by exchange of alkoxy groups.

27. (Previously presented) A process according to claim 22, wherein the esterification reaction comprises a polyesterification comprising the reaction of terephthalic acid, dimethyl terephthalate, dimethyl naphthalenate or naphthalene dicarboxylic acid with 1,2-ethanediol, 1,4-butanediol, 1,3-propanediol, 1,6 cyclohexane dimethanol, trimethylolpropane or pentaerythritol.

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28. (Previously presented) A process according to claim 22, wherein the catalyst is present in an amount in the range 10 to 1200 parts per million calculated as parts by weight of total metal (Ti, Zr or Al plus Ge, Sb or Sn) with respect to weight of product ester.

29. (Previously presented) A process according to claim 22 or 27, wherein the esterification reaction is a polyesterification and the catalyst is present in an amount in the range 5 to 550 parts per million calculated as parts by weight total metal (Ti, Zr or Al plus Ge, Sb or Sn) with respect to weight of product polyester.

30. (Previously presented) A process according to claim 22, wherein the total amount of titanium, zirconium or aluminum present is in the range 5 to 500 parts per million calculated as parts by weight of Ti, Zr or Al with respect to weight of product ester and the total amount of germanium, antimony or tin present is in the range 5 to 700 ppm calculated as Ge, Sb or Sn with respect to product ester.

31. (Previously presented) A process according to claim 22, wherein the total amount of titanium, zirconium or aluminum present is in the range 3 to 250 parts per million calculated as parts by weight of Ti, Zr or Al with respect to weight of product polyester and the total amount of germanium, antimony or tin present is in the range 3 to 300 ppm calculated as Ge, Sb or Sn with respect to product polyester.

32. (Original) A polyester comprising the residues of a reaction between a polybasic acid or ester thereof with a polyhydric alcohol and further containing residues of a catalyst system comprising:

- (a) the reaction product of an orthoester or condensed orthoester of at least one metal selected from titanium, zirconium or aluminium, an alcohol containing at least two hydroxyl groups and an organophosphorus compound containing at least one P-OH group, and
- (b) at least one compound of germanium, antimony or tin.

33. (Previously presented) The catalyst composition of claim 1 wherein said reaction product is obtained by mixing the orthoester or condensed orthoester and a dihydric alcohol; and, subsequently, adding a said base, followed by addition of the organophosphorus compound.

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34. (Previously presented) The catalyst composition of claim 3 wherein said reaction product is obtained by adding said 2-hydroxy carboxylic acid to said orthoester or condensed orthoester before said organophosphorus compound is added.

35. (Previously presented) The catalyst composition of claim 3 wherein at least a portion of said 2-hydroxy carboxylic acid is neutralized with at least a part of said base and the resulting salt is added to the other components of the reaction mixture.

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